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No. III. The Linear-leaved North American Species of Potamogeton, Section Axillares, by M. L. Fernald. 183 pp., 40 plates, 31 maps. 1932. $3.00.

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POTAMOGETON TENNESSEENSIS: FIG. 1, fruiting top, × 1; FIG. 2, submersed foliage, × 1; FIG. 3, stipule and base of submersed leaf, × 10; FIG. 4, upper half of submersed leaf, × 10, by transmitted light; FIG. 5, fruiting spike, × 4; FIGS. 6 and 7, mature fruits, × 10.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CXIII.

M. L. Fernald

(Plates 412–434)[1]

During the studies necessary in a thorough revision of Gray's *Manual* much new or newly interpreted matter is inevitably accumulated. The following items assembled during the past two years are here published in the more extended form which, of course, will be impossible in the condensed work, when eventually finished. In a few cases, the new *Potamogeton* for instance, plants slightly outside the manual-range are discussed.

I. A NEW PONDWEED FROM TENNESSEE

In May, 1933, Professor H. M. Jennison, swimming across Clear Fork River in Morgan County, Tennessee, found himself dragging ashore strands of a flowering pondweed, of which he brought material to the Gray Herbarium. In my recent *Linear-leaved North American Species of Potamogeton*[2] there was no provision for Jennison's plant, unless under *P. bicupulatus*. The material was barely in flower, but it lacked the rounded axillary lower spikes and had much longer-peduncled emersed spikes and larger floating leaves with 9–23, instead of 5–7 nerves. The plant not being *P. bicupulatus*, I suggested the possibility that it might be the long unknown and wholly provisional

[1] The photography and preparation of the engraver's blocks have been made possible through grants to the author from the Milton Fund for Research and the Wyeth Fund of the Division of Biology, both of Harvard University. The cost of reproduction in Rhodora has been most generously defrayed by Mr. Bayard Long.

[2] Mem. Am. Acad. xvii[1].—Mem. Gray Herb. no. iii. (1932).

P. Purshii Tuckerm. Am. Journ. Sci. ser. 2, vi. 228 (1848). Now, thanks to the activity of Dr. H. K. Svenson, we have a fine suite of material of Jennison's plant in fruit and some in flower showing that it is a species unique in many characters and as closely allied to the subsection *Nuttalliani* (*P. epihydrus* Raf.) as to the subsection *Hybridi* (*P. bicupulatus* Fern., *P. capillaceus* Poir., etc.), in fact standing midway between those two American subsections. Its adnate stipules and linear-filiform, flaccid, submersed leaves without lateral nerves show, also, that it is not wholly unrelated to the primitive subgenus *Coleogeton*.

As to the name *Potamogeton Purshii*, I expressed myself in 1932. The name was published as a provisional one of Tuckerman's, meant to clinch the naming of the species, should some one later carefully work it out:

> The upshot was that upon Pursh's sterile and perhaps unidentifiable specimen Tuckerman made a provisional species: "Should the fruit confirm its apparent claims to be considered a species, it may not inappropriately take the name of *P. Purshii*."
>
> The type of *P. Purshii* has not been studied by subsequent authors and many guesses have been made as to its identity. On account of its inclusion by Tuckerman under his discussions of *P. Claytonii* it has often been supposed to belong with that (*P. epihydrus*, var. *Nuttallii*); but the submersed leaves, as described by Tuckerman, are altogether too narrow. Graebner in Engler, Pflanzenr. iv[11]. 45 (1907) took up *P. Purshii* of "Virginia and Carolina" without question for the boreal species, *P. Oakesianus* Robbins (Newfoundland and the Labrador Peninsula to the Adirondacks, etc., south to New Jersey). Obviously, *P. Purshii* cannot be the latter more northern plant; and its identification must await study of the type. Tuckerman deposited material in many herbaria of his time and the type of *P. Purshii* has not yet been located.
>
> As already stated, *provisional* names, such as *P. Purshii*, are a nuisance. Their authors put them forward in order to occupy the field in case they eventually prove to be worth taking up. Unfortunately, the proposition put forward at the International Congress at Cambridge to reject such names as not validly published, did not win the support it deserved. Until we are allowed to reject such names they will always be a source of uncertainty and instability. The more sources of doubt we can eliminate the sounder will be our nomenclature. In this case, however, with *P. Oakesianus* not found in Virginia and Carolina, it is not probable that the ill-advised name *P. Purshii* will be more than a recurring annoyance.

Although these provisional names were not excluded at the International Congress at Cambridge (1930), they were, most happily, ruled out at Amsterdam (1935). The vague and unsatisfactorily published *Potamogeton Purshii* thus disappears and the question whether Jennison's and Svenson's material belongs to it becomes merely an academic

one except for the geographic interest of knowing whether Tuckerman's plant of "slow flowing streams of Virginia and Carolina" is the same. At any rate, the Tennessee plant may appropriately take the name

Potamogeton **tennesseensis**, sp. nov. (tab. 412), caulibus tenuissimis ad 1.5 mm. diametro 3–6 dm. longis subsimplicibus vel valde ramosis; foliis submersis flaccidis lineari-filiformibus 0.2–0.6 mm. latis uninerviis vel obsolete trinerviis valde lacunatis apice attenuatis basi stipulis hyalinis convolutis obtusis adnatis; foliis natantibus lanceolatis vel lanceolato-oblongis acutis, petiolis plerumque quam lamina foliorum valde longioribus, laminis 2–4 cm. longis 5–13 mm. latis 9–23-nerviis, nervis subtus impressis; pedunculis crassis clavatis 3–8 cm. longis adscendentibus; spicis cylindricis 1–2.2 cm. longis, maturis 4.5–6 mm. crassis; connectivis unguiculatis 2 mm. longis limbo oblatis 1.5 mm. latis; fructu quadrato-orbiculato a latere compresso 3-carinato 2.5–3 mm. longo 2–2.5 mm. lato, basi truncato 0.8–1 mm. lato, dorso semi-orbiculato alato-carinato, carina acuta 0.5–0.8 mm. lata, integra vel remote obtuseque dentata, carinis lateralibus acutis integris, ventre convexo obtusanguli, lateribus inter carinis lateralibus latis planis, rostro marginale erecto 0.4 mm. longo.—Tennessee: Clear Fork River, 1 mile north of Rugby, Morgan County, May 28, 1933, *H. M. Jennison*, no. 33–139 (flowering material); abundant in eddies of a rapid stream, Clear Fork, Clarkrange, 20 miles south of Jamestown, Fentress County, July 11, 1935, *H. K. Svenson*, no. 6756 (type in Gray Herb.; isotypes in Herb. Brooklyn Bot. Gard. and elsewhere); Daddy's Creek, by mill south of Crossville, Cumberland County, July 20, 1935, *J. K. Underwood & A. J. Sharp*, no. 2961.

Potamogeton tennesseensis, known only from streams of the Cumberland Plateau, at altitudes from 1400 feet (Rugby) to about 1900 feet (Crossville), is a remarkably interesting plant. It bridges the gap which has hitherto clearly separated the *Hybridi*, a purely American subsection of § *Axillares*, and the subsection *Nuttalliani* (*P. epihydrus* Raf.), widely dispersed over temperate North America and reported (though doubted) from Japan. In its almost capillary, submersed leaves (fig. 2) adnate to the bases of the stipules (fig. 3) and in the production late in the season of tufts of subcapillary leaves (fig. 1) from among the dilated ones it inevitably suggests *P. capillaceus* Poir. and the local Alleghenian *P. bicupulatus* Fernald of the *Hybridi;* and the adnate stipules and simple leaf-structure also suggest *P. filiformis* and other members of subgenus *Coleogeton*. Its floating leaves, too, suggest those of *P. capillaceus* and *P. bicupulatus* but they are larger and with 9–23 nerves, the dilated leaves of *P. capillaceus* having 3–7, of *P. bicupulatus* 5–7 nerves. In the number of nerves

these leaves of *P. tennesseensis* more nearly approach those of *P. Spirillus* Tuckerman (5–15) and of *P. diversifolius* Raf. (7–15), but in those species the dilated leaves are blunt or emarginate and the narrowly ribbon-like submersed leaves blunt and at base more adnate to the stipules. In the *Hybridi* all the species have few-flowered and subglobose, sessile or barely peduncled spikes in the axils of the submersed leaves; these are quite wanting in *P. tennesseensis*. In the *Hybridi* all the species have the elongate upper spikes on peduncles but 0.2–3 cm. long and the sepaloid connectives 0.5–1 mm. long (the peduncles of *P. tennesseensis* 3–8 cm. long, the connectives 2 mm. long). In all the *Hybridi* the fruits are strongly compressed laterally, beakless or with beak a minute tooth, the form of the spiral embryo is clearly evident through the thin coat, and the fruits, 1–2.2 mm. long, are usually strongly toothed on the dorsal keel; *P. tennesseensis* has less compressed fruits (figs. 5–7) with thick coat completely hiding the form of the embryo, the beak erect and stout, the dorsal and sharp lateral keels entire or essentially so and the mature fruits 2.5–3 mm. long. In the Alleghenian *P. bicupulatus*, which it superficially resembles, the fruits have the sides, between the coarsely dentate-sinuate lateral keels and the ventral margin, cup- or crater-like; in *P. tennesseensis*, however, the sides are essentially flat and the low lateral keels entire.

P. tennesseensis, therefore, can hardly be placed in the subsection *Hybridi;* but when we turn to the *Nuttalliani* we meet with the need, if we are to place it there, of redefining the subsection. The submersed leaves of the *Nuttalliani* are ribbon-like and up to 1 cm. broad, with free hyaline stipules; but otherwise, in dilated leaves, thickened base of stem, elongate peduncles, uniform spikes and fruits, *P. tennesseensis* is better placed with *P. epihydrus* than anywhere else in our pondweeds. The general shape of the fruits, with thin, entire dorsal and lateral keels and essentially flat faces, as well as the stout, though short, beak and the curve of the embryo (not shown in the plate) all place it there.

In view of the well known concentration on the Cumberland and other Plateaus of eastern Tennessee and adjacent areas of the old Appalachian upland of relic-species of many groups (animals as well as plants), I am inclined to look upon *Potamogeton tennesseensis* as a persistent remnant of the ancestral series from which the American subsection *Nuttalliani* and the other American subsection *Hybridi*

have diverged, the first toward the development of ribbon-like and quite free submersed blades, the second retaining the adnation of the leaf-bases and stipules and the slender submersed blades but developing the small submersed (cleistogamous?) spikes and the thinner-walled fruits which characterize the subsection.

II. PILEA IN EASTERN NORTH AMERICA

PILEA PUMILA (L.) Gray, var. **Deamii** (Lunell), comb. nov. *Adicea Deamii* Lunell in Am. Midl. Nat. iii. 10 (1913). PLATE 413, FIGS. 10–15.

The late Dr. J. Lunell proposed to split the temperate North American members of the genus *Pilea* Lindl. (*conserved name*), as *Adicea* Raf., into five species. His *A. fontana* and *A. opaca*, both described from Pleasant Lake, Benson County, North Dakota, have black or blackish fruits, his *A. Nieuwlandii*, *A. Deamii* and *A. pumila* (L.) Raf. having the fruits green to stramineous. The latter series was split on size and degree of branching of plant and size of fruit, both characters which, in an annual weedy group, are very unstable. Individuals with simple stems and low stature (15–25 cm.) were called *A. Nieuwlandii*, those with the stem taller and branching from base were treated as *A. Deamii* and *A. pumila;* but no provision was made for plants with low stature and branching stems and for individuals with simple and tall (sometimes 5–6 dm. high) stems, such as are familiar to every observant field-botanist. As typical *A. pumila* Lunell chose a series of plants from the Potomac Valley, with "Stem reaching a length of 6 dm., with later on spreading branches" and with the leaves 8–16-toothed on each margin. Lunell was not much influenced by the elementary facts, that the basic *Urtica pumila* L. Sp. Pl. 984 (1753) had its "*Habitat in* Canada" and with "Caulis *digiti altitudine*, simplex," for he dismissed these matters as "indicating that Linnaeus made his description from an immature or poorly nourished specimen"; but, getting material of a "Planta 15–25 cm. alta, simplex . . . Folia . . . dentibus 4–7 crasse crenato-serrata," Lunell did not hesitate to describe it as a new species, *A. Nieuwlandii*. Now, it so happens that the Canadian material before me (11 nos.) has stems varying from a "finger's length and simple (Caulis *digiti altitudine*, simplex)" to taller and branching, 0.6–4.5 dm. high, and the leaves have 3–9 coarse rounded teeth on each margin. This is unquestionably *Urtica pumila* L., therefore *Pilea pumila* (L.) Gray.

Typical *Pilea pumila*, with leaves usually cuneate at base and with the largest blades with 3–11 coarse rounded teeth (FIGS. 1–5) is common in southern Canada, from Prince Edward Island to southern Ontario, extending south to Pennsylvania (and locally to Virginia), Tennessee, Iowa and South Dakota. In the South, from Florida to eastern Texas, extending northward to western New York, Ohio, Indiana, Illinois, Missouri and Kansas, *P. pumila* has the leaves (FIGS. 10–13) more often rounded at base, the teeth usually less rounded or even acute and those of the larger leaves numbering 11–17. It is this plant of wide southern and inland range that Lunell described as *Adicea Deamii* "Folia . . . dentibus 6–12 crasse crenato-serrata, basi cuneata vel rotundata," for, although Lunell gave a maximum of 12 serrations, an ISOTYPE in the Gray Herbarium shows the larger leaves (FIG. 10) with 16. By its more commonly round-based leaves with more numerous and commonly less rounded teeth *P. pumila*, var. *Deamii* is well distinguished from typical *P. pumila;* but too many transitions occur to allow their separation as species. Their fruits (FIGS. 14, 15) are of similar shape and smoothness or with quite similar purplish markings.

As to the black-fruited plants called by Lunell *Adicea fontana* and *opaca*, it is notable that they came from the same locality, the former "found on a narrow strip along the boggy margin of a rill, in deep shade, . . . in the woodland of Pleasant Lake, Benson County, North Dakota"; the latter "in damp, but drained soil, well shaded, somewhat distant from the rill where the preceding species thrives." The plant of the boggy and unfavorable habitat grew 4–8 cm. high and was simple (the very reaction of *P. pumila* under such conditions), with "seeds 1.5 mm. long"; while the plant of better "drained soil" near-by reached a height of 3 dm. and branched and its seeds were slightly larger; therefore two species! Rydberg has taken up both of them, as *Pilea opaca* (Lunell) Rydb. in Brittonia, i. 87 (1931) and *P. fontana* (Lunell) Rydb. l. c., but in my own work I am uniting them as *P. fontana* (the name with page-priority), a species characterized by firm and hardly lustrous opaque small leaves, with relatively short petioles, the black fruits (FIG. 16), as pointed out to me by Mr. C. C. Deam, pale-margined and roughened by low knobs or bosses. It occurs from North Dakota to Nebraska, extending eastward to western New York. Frequent immature specimens of *P. pumila* have the young fruits darkened in drying, but *ripe* fruits seem to be always pale.

III. MEMORANDA ON RANUNCULUS

RANUNCULUS FLABELLARIS Raf., forma **riparius**, nom. nov. *R. delphinifolius*, forma *terrestris* Glück, Beihefte Bot. Centralbl. xxxix. Abt. ii. 328 (1923), nec *R. delphinifolius*, f. *terrestris* (Gray) Blake, RHODORA, xv. 164 (1913). PLATE 414, FIGS. 5 and 6.

Unfortunately, the name *Ranunculus delphinifolius* Torr. is not the earliest one available. One of the first definitions of the large Yellow Water-Crowfoot of America was by Jacob Bigelow, Fl. Bost. 139 (1814), who gave a very detailed and accurate account of it, but supposed it to be the Old World *R. fluviatilis* Willd. Our plant is wholly distinct from *R. fluviatilis*, as Bigelow's clear description shows, and the always watchful Rafinesque promptly seized his opportunity. In his review of Bigelow he went through the simplest motions necessary for the designation of a new species; but these were technically enough:

> *Ranunculus fluviatilis*, Big. is *R. flabellaris*, Raf. n. sp.—Raf. in Am. Mo. Mag. ii. no. v. 344 (March, 1818).

In view of the very detailed description given by Bigelow there is no question of the validity of *Ranunculus flabellaris* Raf. (March, 1818). The next name, the one currently in use, is *R. delphinifolius* Torrey in Eaton, Man. ed. 2: 395 (late Spring of 1818). This was put out by Amos Eaton with proper diagnosis and the explanatory note: "A new species by Dr. Torrey; though he suspects it may be a variety of fluviatilis." Subsequently, in Torr. & Gray, Fl. i. 20 (1838) and in his own Fl. N. Y. i. 14 (1843), Torrey treated *R. fluviatilis* Big. and *R. delphinifolius* Torr. as identical; and there seems no reason to doubt their identity. The only question is that of the dates of publication of *R. flabellaris* Raf. and *R. delphinifolius* Torr., both regularly cited simply as "1818." Rafinesque's name was in the March number of The American Monthly Magazine, this preceded by a number designated as of February, 1818, and followed by one for April, 1818; there is no obvious reason to doubt the date.

Eaton's Manual, ed. 2, bears the formal record of copyright, so frequent at that time and so rare today. Richard R. Lansing, Clerk of the Northern District of New York, made the legal memorandum:

> BE IT REMEMBERED, That on the twelfth day of May, in the forty-first year of the Independence of the United States of America, WEBSTERS and SKINNERS, of the said district, have deposited in this office, the title of a book, the right whereof they claim as proprietors, in the words following, to wit:
> "A Manual of Botany of the Northern and Middle States . . . By Amos Eaton, A. M. . . . Second edition, corrected and enlarged."

Eaton's Manual, ed. 2, was issued two months or more later than the March number of The American Monthly Magazine. It is probable that it was not actually distributed to the public until some time later. The copy in the library of the Gray Herbarium has this dedication on the title-page:

To Dr. Jacob Bigelow, Presented by his friend The Author, Albany, Aug. 4th, 1818.

Further evidence of the date of issue of Eaton's 2d edition is found on his p. 502, where begin the Additions and Corrections: "After 432 pages were struck off, I received Nuttall's genera of North American plants." This is significant, for Nuttall's Genera of North American Plants . . . to the year 1817, was entered for copyright at Philadelphia on April 3d, 1818:

BE IT REMEMBERED, That on the third day of April, in the forty-second year of the Independence of the United States of America, A.D. 1818, Thomas Nuttall of the said district, has deposited in this office the title, etc.

It is impossible not to note the discrepancy in the two registrations: Eaton's in the District of Northern New York in May, "in the forty-first year of the Independence of the United States"; Nuttall's in the District of Pennsylvania in April, "in the forty-second year of the Independence of the United States." This, surely, reflects only a difference in the method of calculation, not a full year's difference in the copyrights. That Eaton's 2d edition was still only in manuscript in late 1817 is shown by the letters from various dignitaries dated "Northampton, (Mass.) Nov. 24th, 1817" and used by Eaton in his Preface (p. 12).[1]

The reason for giving a new formal name instead of transferring *Ranunculus multifidus*, var. *terrestris* Gray, Man. ed. 5: 41 (1867), the nomenclatural type of *R. delphinifolius*, f. *terrestris* (Gray) Blake, l. c. (1913), must be clarified. Gray, l. c. (1867), described *R. multifidus*, var. *terrestris* from a collection made at Ann Arbor, Michigan by Miss Clark. It

differs from the ordinary emersed forms by the stems ascending from the base and paniculately several-flowered at the summit, where the leaves are reduced to oblong or linear bracts; no immersed dissected leaves.—Ann Arbor, Michigan, on muddy banks, *Miss Clark.*

[1] Of this letter Eaton said "It is only the last paragraph, which can be interesting to the public." The "interesting" paragraph follows:

"As his class consisted chiefly of ladies, and as these branches of learning have not hitherto generally engaged the attention of the sex; we take the liberty to state, that, from this experiment [Eaton's lectures to them], we feel authorized to recommend these branches as a very useful part of female education."

Every one has assumed that Gray had before him the common terrestrial form (PLATE 414, FIGS. 5 and 6) of *Ranunculus delphinifolius* Torr. (or *R. flabellaris* Raf.). Consequently, we have had the names for the terrestrial form of the latter: *R. lacustris*, var. *terrestris* (Gray) MacMillan, Metasp. Minn. Val. 247 (1892); *R. delphinifolius*, var. *terrestris* (Gray) Farwell, Ann. Rep. Comm. Parks & Boulev. Detroit, xi. 63 (1900); and the combination by Blake above noted. In general it seems to have occurred to none of these authors (nor to myself when I gave a new name to a similar plant) carefully to check the Clark material from Ann Arbor, the type of *R. multifidus*, var. *terrestris* Gray, distinctly marked by him in the Gray Herbarium. This type (our PLATE 415, FIGS. 1–3) does not belong to the coarse *R. flabellaris* or *delphinifolius*, as has been universally assumed, but is the small-flowered plant which was described as *R. Purshii* Richardson, var. *prolificus* Fern. RHODORA, xix. 135 (1917). The comparatively southern *R. flabellaris* (plate 414, FIGS. 1–4) and the more northern *R. Purshii* have very positive differences:

R. FLABELLARIS: Submersed leaves 0.3–1.5 dm. long, ternately decompound into linear-filiform segments; sepals 5–8 mm. long; petals 0.6–1.7 cm. long; anthers oblanceolate to oblong, 1–1.5 mm. long, only slightly broader than the clavate filaments; fruiting heads 8–13 mm. long; mature achenes prominently corky-thickened at base and along the ventral margin, including the beak 2.5–3.5 mm. long.—Maine to Washington, south to North Carolina, Arkansas, Kansas and California.

R. PURSHII: Submersed leaves nearly orbicular, 1.5–8 cm. broad, with 3–5 cuneate linear-cleft lobes; sepals 2.5–4 mm. long; petals 3.5–5 mm. long; anthers ellipsoid, 0.5–1 mm. long, twice as broad as the slender filaments and sharply differentiated; mature achenes not at all or but slightly corky-margined, 1.5–2 mm. long.—Labrador Peninsula to Alaska and Siberia, south to Nova Scotia, northern Maine, Michigan, Iowa, North Dakota, New Mexico and Oregon.

The type of *Ranunculus multifidus*, var. *terrestris* Gray (PLATE 415, FIGS. 1–3) belongs very definitely with *R. Purshii* (FIGS. 5–8), not with *R. flabellaris* (PLATE 414, FIGS. 1–4) and, as already noted, it is the upright paniculate-branched *R. Purshii*, var. *prolificus*. Singularly enough, the name *R. multifidus*, var. *terrestris* Gray cannot be made the basis for a varietal or formal combination under *R. Purshii*, since, in 1842, Ledebour described the terrestrial and creeping form (*R. limosus* Nutt.) of *R. Purshii*, with thick and subglabrous to villous 3–5-parted leaves as *R. Purshii*, var. *terrestris* Ledeb. Fl. Ross. i. 35 (1842) and this plant has been taken up as *R. Purshii*, f. *terrestris* (Ledeb.) Glück, l. c. 330 (1923).

RANUNCULUS AMBIGENS Wats. In 1879 Sereno Watson defined the

coarse, decumbent perennial of wet clay in the northeastern United States, the plant with lance-attenuate and very sharp-pointed leaves, as *Ranunculus ambigens* Wats. Proc. Am. Acad. xiv. 289 (1879). The plant had formerly been confused with the western *R. alismaefolius* Benth. and with the chiefly European (but in Newfoundland and Nova Scotia) *R. Flammula* L. So far as shown by the specimens in the Gray Herbarium, *R. ambigens* occurs from Maine to Illinois, south into Delaware, Maryland and Tennessee; and it is at once distinguished by its coarse, elongate, creeping stem rooting at the nodes, its upper and median leaves long-acuminate, and its achenes tipped by a subulate beak 0.6–1.5 mm. long. There is absolutely no question as to the identity of *Ranunculus ambigens;* and the name was correctly used by Watson & Coulter in Gray, Man, ed. 6, and by Gray in the Synoptical Flora.

In Britton & Brown, Ill. Fl. ii. 76 (1897) the plant is satisfactorily illustrated under the name *Ranunculus obtusiusculus* Raf. Med. Rep. ser. 2, v. 359 (1808); and under this name the species has been known by those who have neither had access to Rafinesque's illustration of his *R. obtusiusculus* nor appreciated the pertinent comments upon it in the Synoptical Flora. The latter memoranda are to the point:

R. obtusiúsculus, Raf. l. c. is equally indeterminable, even with the help of a tracing from an original sketch, possessed by the N. Y. Academy of Sciences, which is probably not true to nature, representing cauline foliage of *R. pusillus*, from an annual root, 5-merous polyandrous flowers with persistent linear-lanceolate sepals and a long style.—Gray, Syn. Fl. i^{1}. 20 (1895).

A tracing from Rafinesque's figure of his plant shows a slender straight erect stem and single annual root, also linear-lanceolate sepals, all at variance with the stout decumbent commonly geniculate and copiously rooting stem and ovate sepals of the present species. Gray, l. c. 27 (1895).

Rafinesque's original diagnosis is here given:

10. Ranunculus obtusiusculus, obtuse ranunculus; stem upright, simple; leaves petiolated, lanceolated, semi-obtuse, flowers few, terminal. In New-Jersey in marshy places.

That Rafinesque's drawing of an *annual*, with bluntish leaves, leafy-bracted peduncles, gamopetalous corolla, linear or linear-lanceolate sepals, and rounded obovate petals (his fig. 2), is not a recognizable illustration of *R. ambigens*, which is a coarse and obvious perennial, with attenuate leaves, bractless peduncles, ovate sepals and distinct (as in all the genus) oblong petals, should be obvious. Whether Rafinesque's drawing was made from actual material before him may

well be doubted; at least the drawing is so unlike anything now known in Nature that it is probably futile to guess about it, as futile as in many other Rafinesquian propositions. Except for the alternate leaves the drawing of the habit could as well have been made from a vague recollection of *Lysimachia* (*Steironema*) *lanceolata* as from *Ranunculus ambigens*. At any rate, to reject the carefully described *R. ambigens* and to take up for it the wholly vague *R. obtusiusculus* leads directly away from clarity into hopeless obscurity.

Ranunculus laxicaulis (Torr. & Gray) Darby, Bot. So. States, 204 (1860), the name taken up in Gray's Manual, ed. 7, may or may not be *R. ambigens*. Darby's own description of a plant from "Ditches Car. to Geo. July" suggests it in some points but Darby's material is unknown; nomenclaturally his species rests upon *R. Flammula*, β. *laxicaulis* Torr. & Gray, Fl. N. Am. i. 16 (1838), the account of which follows:

> β. *laxicaulis:* stem weak, much branched; leaves all entire; lowest ones elliptical-oblong, upper ones linear; petals oblong, attenuate at the base, three times as long as the calyx . . . β. Milledgeville, Georgia, *Dr. Boykin!*

The Boykin specimen, type of *R. Flammula*, β. *laxicaulis* is not at the Gray Herbarium and Dr. Gleason writes me that it cannot be found in the Herbarium of the New York Botanical Garden. Nor have I seen in either herbarium any material from the Atlantic States from south of Delaware and Maryland, although there is a specimen without detailed data at New York said on the copied label to be from Georgia. This, however, is one of the many unlocalized sheets from Chapman, too many of which are open to doubt. The petals of *R. ambigens* only slightly exceed the sepals (sepals 5–7 mm. long, petals 5–8 mm. long); but Torrey & Gray described the "petals . . . three times as long as the calyx." They also had "a weak much branched" plant with "leaves all entire," not a convincing description of the coarse stem (0.5–2 cm. thick at base), simple or only slightly forking, of *R. ambigens*, which has the middle and upper leaves toothed. Their description suggests *R. oblongifolius* Ell.; at least it is unwise to maintain *R. laxicaulis* for the undoubted *R. ambigens*.

Ranunculus rhomboideus versus R. ovalis. *Ranunculus rhomboideus* Goldie in Edinb. Phil. Journ. vi. 329—Reprint, 11—, pl. xi. fig. 1 (1822), well described and clearly illustrated by its discoverer, who found it "In dry sandy fields, near Lake Simcoe, Upper Canada

[Ontario Co., Ontario]," is a wide-ranging prairie species which occurs from eastern Alberta to Colorado, thence across the prairies to Ontario, Michigan and Illinois. Goldie correctly showed it with characteristically toothed leaves and it has regularly been thus correctly described or illustrated by later authors. In 1814 Rafinesque gave a characteristically inexact and unrecognizable description of

Ranunculus ovalis. Feuilles radicales à longs pétioles, ovales, entières, velues, aigues, les caulinaires rares sessiles lancéolées, fleurs terminales peu nombreuses. *Dans le Canada et Genessee.*—Raf. Précis des Découvertes, 36 (1814), reprinted in Desv. Journ. de Bot. iv. (or vi.), 268 (1814).

A. P. DeCondolle, to whom Rafinesque sent many of his species, could make nothing of *Ranunculus ovalis* and placed it in his "*Ranunculi non satis noti*"—DC. Prodr. i. 43 (1821); but, unfortunately, Hooker, although taking up *R. rhomboideus* Goldie, tried to keep apart from it as species two variations which subsequent experience shows to be mere phases of *R. rhomboideus.* These phases of one species, treated by Hooker as three species, were *R. rhomboideus*, *R. ovalis* "*Rafin.* . . . ?" and *R. brevicaulis* Hook. Fl. Bor.-Am. i. 13, t. vii. A (1829). Hooker gave a good plate of what he took to be Rafinesque's *R. ovalis* as his t. vi B, a fine representation of luxuriant *R. rhomboideus*, which looks as if it might almost have come from Goldie's series of specimens. Hooker, showing the regularly dentate and obtuse basal leaves of *R. rhomboideus*, made the comment: "This species is not at variance with the short character given in Journ. de Bot. of Rafinesque's *R. ovalis*, except that he states the cauline leaves to be lanceolate; by which he means, perhaps, that the segments are so." To render the interpretation of Rafinesque's account more thorough he should have added: "and except that Rafinesque said 'Feuilles radicales . . . entières, . . . aigues', by which he meant, perhaps, radical leaves dentate, obtuse, and except that Rafinesque's plant came in part from Genessee (a county of northwestern New York, organized in 1802), whence no collections have ever been known to the botanists of the State of New York."

The identity of Rafinesque's *Ranunculus ovalis* is utterly vague; but to take up his name of a plant with entire and acute basal leaves and lanceolate cauline ones, a plant said to come from Genessee, for the well defined *R. rhomboideus*, seems like straining for vagueness and inaccuracy. This, however, is done in the Illustrated Flora, where the plant called *R. ovalis*, without interrogation, is shown and described

with "basal leaves . . . crenate or slightly lobed, obtuse, . . . upper cauline leaves . . . deeply divided . . . into 3–7 linear or oblong obtuse lobes"; and the range given, correctly, definitely excludes Genessee. My reasons for maintaining *R. rhomboideus* need no further statement.

Ranunculus septentrionalis Poir., var. **caricetorum** (Greene), comb. nov. *R. caricetorum* Greene, Pittonia, v. 194 (1903). *R. sicaeformis* Mackenzie & Bush in Torreya, vi. 123 (1906).

The wide-ranging *Ranunculus septentrionalis* varies, like most members of § *Eurananculus*, in the degree of pubescence and the direction of its trichomes. It may be quite glabrous, sparingly to copiously appressed-pubescent or sparingly to copiously spreading-hirsute. In the large series from eastern Canada and the northeastern states westward to Manitoba and Nebraska I get no clear lines by which to differentiate the smoother and the more hirsute extremes. Either quite glabrous or very densely hirsute plants occur in Quebec, New England and the Great Lakes region. Var. *caricetorum*, confined so far as I have seen material, to the region from south-central Ohio to Missouri, Iowa and Minnesota has the densest of hirsuteness and this is largely retrorse. In the great density and reflexing of its pubescence the variety is unique; but I find no other characters to separate it from the general run of hirsute or hispid *R. septentrionalis*.

In the effort to brace the specific claims of the retrorsely hirsute plant overemphasis has been given the glabrousness of some specimens of *Ranunculus septentrionalis*. Thus, in his Flora of the Prairies and Plains, Rydberg gives the key differences:

Stem glabrous or nearly so	17. *R. septentrionalis.*
Stem decidedly hispid	18. *R. caricetorum.*

R. caricetorum Greene, Pittonia, v. 194 (1903) was described from "the region of the Great Lakes, from perhaps Ontario to Iowa and Minnesota, . . . diagnosis . . . from material of my own gathering in southern Wisconsin in 1888, and in southern Michigan in 1902": "commonly very hirsute, at least as to petioles and lower part of stem, otherwise sparingly hirsute-pubescent." Rydberg maintains *R. caricetorum*, correctly reducing *R. sicaeformis* (as *R. "sicaefolius"*) to it. The two are identical, but Greene said nothing of the copious retrorse pubescence on leaves and peduncles exhibited by his type-material, and also by the type and the other Missouri specimens of *R. sicaeformis*. Greene said of his Great Lakes plant,

"commonly very hirsute, at least as to petioles and lower part of stem, otherwise sparingly hirsute-pubescent," so that it is clear that he did not understand the true character of his type. Just such plants as Greene's description implies are common about the Great Lakes, thence north to Hudson Bay and east to New England and Quebec. But Mackenzie & Bush were more explicit, saying the "whole plant very strongly whitish or yellowish hispid-pubescent." Besides the type material, they cited also a specimen from Hennepin Co., Minnesota. The latter is like the type of *R. caricetorum*, a photograph of which has been most generously presented to the Gray Herbarium by Dr. Stuart K. Harris, who secured it while visiting Greene's herbarium in 1935. As I view the plants, there is little significance to the degree of pubescence on the stems and petioles; but the plant with dense and *retrorse* pubescence in the southwestern edge of the specific range is very definite.

As to Rydberg's characterization of *Ranunculus septentrionalis* as having "Stem glabrous or nearly so," it is significant that Poiret, in his original description of *R. septentrionalis* said very definitely: "*caule petiolisque basi hirsutis*" and "les tiges . . . velues ou pubescentes à leur partie inferieure." A tracing of Poiret's type in the Gray Herbarium settles its specific identity.

Ranunculus fascicularis Muhl., var. **apricus** (Greene), comb. nov. *R. apricus* Greene, Pittonia, iv. 145 (1900).

Very distinct in the region from Mississippi to Oklahoma and Texas, Greene's *Ranunculus apricus* passes northward very clearly into *R. fascicularis*, the plants from Michigan to Iowa having to be somewhat arbitrarily sorted.

IV. THE NOMENCLATURE OF SASSAFRAS

Enough changes have recently been made in the "proper" specific name of *Sassafras* to suggest that its nomenclature partakes of its nature, as reflected in the illegitimate names *Laurus variifolia* Salisb. and *L. diversifolia* Stokes. One of the most recent discussions of the names is that of Blake, *Note on the proper Name for the Sassafras*, Rhodora, xx. 98 (1918). There Blake pointed out, correctly, that the name *Laurus variifolia* Salisb. (1796) was a mere substitute for *L. Sassafras* L. (1753) and, since there was already a valid specific epithet under *Laurus*, Salisbury's name was illegitimate. Blake, therefore, concluded that "The valid name to replace it is Sassafras

OFFICINALE Nees & Eberm. . . . (1831)." Unfortunately, however, Blake's usually keen logic suffered a momentary and unprecedented lapse, for immediately after asserting that the earliest *valid* name was published in 1831, he made a varietal combination under it, *S. officinale*, var. *albidum* (Nutt.) Blake, based upon Nuttall's species, *Laurus* (*Euosmus*) *albida*, published in 1818. So far as I can yet determine the first *valid* specific epithet for the aggregate species was that of Nuttall and I see no way, under the International Rules, to avoid taking up for the variable species the combination *Sassafras albidum* (Nutt.) Nees, Syst. Laurin. 490 (1836). The bibliography follows:

SASSAFRAS ALBIDUM (Nutt.) Nees, Syst. Laurin. 490 (1836); Raf. Aut. Bot. 86 (1840). LAURUS (EUOSMUS) ALBIDA Nutt. Gen. i. 259 (1818). *Evosmus albida* "Nutt." acc. to Spreng. Syst. ii. 267 (1825) as synonym. *Tetranthera albida* (Nutt). Spreng. Syst. ii. 267 (1825). *Euosmus albida* "Nutt." acc. to Jackson, Ind. Kew. ii. 914 (1893). *S. variifolium*, var. *albidum* (Nutt.) Fernald in RHODORA, xv. 16 (1913). *S. albidum*, var. *glauca* Nieuwl. in Am. Mid. Nat. iii. 347 (1914). *S. officinale*, var. *albidum* (Nutt.) Blake in RHODORA, xx. 99 (1918).

Var. **molle** (Raf.) comb. nov. *Laurus Sassafras* L. Sp. Pl. 371 (1753). *L. Salsafraz* Noronha in Verh. Batav. Gen. v. (1790), Art. iv. 19, modification in spelling. *L. variifolia* Salisb. Prodr. 344 (1796), substitute for *L. Sassafras* (illegitimate). *L. diversifolia* Stokes, Bot. Mat. Med. ii. 426 (1812), substitute for *L. Sassafras* (illegitimate). *S. officinarum* J. S. Presl. Rostl. ii. 68 (1825), not seen. *Persea Sassafras* (L.) Spreng. Syst. ii. 270 (1825). *S. officinale* Nees & Eberm. Handb. Med.-Pharm. Bot. ii. 418 (1831). *S. rubrum* Raf. Sylva Tell. 134 (1838), name only (application inferred). *S. triloba* Raf. Aut. Bot. 85 (1840), based on *Laurus Sassafras*. S. TRILOBA Raf., var. MOLLIS Raf. Aut. Bot. 85 (1840). *S. Sassafras* (L.) Karst. Pharm.-Med. Bot. 505 (1882). *S. variifolium* (Salisb.) Ktze. Rev. Gen. ii. 574 (1891). *Euosmus Sassafras* (L.) "Nutt." acc. to Jackson, Ind. Kew. ii. 914 (1893). *S. Laurus* Macloskie in Torreya, v. 198 (1905). *S. Sassafras officinale* (Nees & Eberm.) Clute in Am. Bot. xi. 72 (1906).

The application of Rafinesque's *Sassafras triloba*, var. *mollis* to the tree with soft-pubescent leaves is clear from his diagnosis: "fol. sepe integris villosis mollis, florib. laxis."

V. MEMORANDA ON ARUNCUS

ARUNCUS ALLEGHENIENSIS Rydb., var. **pubescens** (Rydb.) comb. nov. *A. pubescens* Rydb. N. Am. Fl. xxii[3]. 256 (1908). PLATE 416, FIG. 4.

The indigenous plants of eastern North America stand well apart from the Old World and western American representatives of *Aruncus*. The wide-ranging Eurasian *A. sylvester* Kostel. (1844) = *Spiraea Aruncus* L. (1753) and *A. Aruncus* (L.) Karst. (1882), has the brownish follicles (FIG. 3) 2.5–3 mm. long, with style (deciduous) 0.3–0.5 mm. long; seeds (FIG. 7) 2.2–2.6 mm. long, with empty tails one-third to one-half as long as the body, the surface coarsely reticulate. Its staminate flowers (FIG. 6) have the calyx-lobes broadly lanceolate, elongate and comparatively thin, displaying the evident midrib; and its leaflets (FIG. 13) are usually very thin, doubly sharp-serrate and long-caudate. The Alleghenian plant, *A. alleghenicnsis,* however, has the leaflets, although similar, tending to shorter-toothed margin and less elongate tip; but its fundamental differences are in the flower and fruit. The calyx-lobes (FIG. 5) are firm (drying dark), broader and more deltoid, without evident midrib; the olivaceous follicles (FIGS. 1 and 2) 1.5–2 mm. long, with style 0.5–0.8 mm. long; the seeds (FIG. 8) 1.5–2 mm. long, with much shorter or obsolete tails and finer reticulation.

So far as I can make out, *Aruncus pubescens* is an interior variety of *A. alleghenicnsis,* differing in its heavier and dull (rather than lustrous) foliage, a tendency to greater pubescence on the leaflets, and follicles slightly more slender and elongate (subcylindric and 1.7–2.5 mm. long, instead of semi-ovoid and 1.5–2 mm. long). Plants with the lower leaf-surfaces soft-pubescent occur in the Alleghenies: Allegheny Co., Pennsylvania (*Schafer*, no. 639), Washington, D. C. (*Steele et al.*), Baltimore, Maryland (*P. V. LeRoy*, 1867, ISOTYPE of *A. alleghenicnsis*), Pulaski Co., Virginia (*Small*) and Glasgow, Virginia (*E. B. Bartram*); but all other material seen by me from Virginia, West Virginia, North Carolina, Kentucky and Tennessee has the lower surfaces quite glabrous. In the more slender-fruited var. *pubescens* (Illinois and Iowa to Arkansas and Oklahoma) the leaflets may, likewise, be either very pubescent, as defined by Rydberg, or quite glabrous beneath: Mikanda, Illinois (*Gleason*), St. Louis, Missouri (*Sherff*, no. 235); and, by a fatality which often pursues those who are incautious in designating types, the MacDonald material from Peoria designated as the TYPE of *A. pubescens* (with leaves "rather copiously hairy beneath") displays no more pubescence than the LeRoy material from Baltimore (in both cases as represented in the Gray Herbarium) which seems to be an ISOTYPE of *A. alleghenicnsis* (separated from *A. pubescens* by

Photo. E. C. Ogden.

PILEA PUMILA, leaf-margins, × 1, seeds, × 20: FIG. 1, from Vermont; FIG. 2, from Maine; FIG. 3, from Quebec; FIG. 4, from Maine; FIG. 5, from Prince Edward Island; FIGS. 6 and 7, from Maine; FIGS. 8 and 9, from Massachusetts.

P. PUMILA, var. DEAMII: FIG. 10, from Indiana (ISOTYPE); FIG. 11, from Indiana; FIG. 12, from Ohio; FIG. 13, from Georgia; FIG. 14, from Indiana; FIG. 15, from New York.

P. FONTANA: FIG. 16, from Indiana.

Photo E. C. Oaden.

RANUNCULUS FLABELLARIS: FIG. 1, fruiting branch, × 5/12; FIGS. 2 and 3, centers of flowers, × 4; FIG. 4, achene, × 10.

R. FLABELLARIS, forma RIPARIUS: rosette, × 5/12; stranded branch, × 5/12.

Photo. E. C. Ogden.

RANUNCULUS PURSHII: FIG. 5, flower, × 4; FIG. 6, achene, × 10; FIGS. 7 and 8, flowering branches, × 5/12.

R. PURSHII, var. PROLIFICUS: FIG. 1, TYPE of *R. multifidus*, var. *terrestris*, × 5/12; FIG. 2, flower, × 4, from the latter; FIG. 3, bud, × 4, from the latter; FIG. 4, flower, × 4, from another Michigan station.

R. PURSHII, forma TERRESTRIS: FIG. 9, three plants, × 5/12.

Photo. E. C. Oaden.

ARUNCUS: fruits × 7; flowers and seeds × 10; leaf-tips × 1.

A. ALLEGHENIENSIS: FIG. 1, over-ripe fruit from ISOTYPE, Baltimore, Maryland; FIG. 2, fruits from Allegheny Co., Pennsylvania; FIG. 5, flowers from District of Columbia; FIG. 8, seeds from West Virginia.

A. ALLEGHENIENSIS, var. PUBESCENS: FIG. 4, fruits from Illinois.

A. SYLVESTER: FIG. 3, fruit from France; FIG. 6, calyx from Hungary; FIG. 7, seed from Austria; FIG. 9, fruits from Oregon; FIG. 10, flowers, showing obovate petals, from Salisburgia; FIG. 11, flowers, with narrow petals, from Vancouver Island; FIG. 12, tip o. leaflet, from British Columbia; FIG. 13, tip of leaflet, from Czechoslovakia.

"leaflets . . . glabrous or nearly so beneath"). The really distinctive character of var. *pubescens*, centering on the Ozark Plateau, is that its follicles are more slender than in typical *A. alleghenicnsis* of the Appalachian Upland.

The wide-ranging plant of the Pacific slope, from northern California to Alaska, is separated by Rydberg as *Aruncus acuminatus* (Dougl.) Rydb. in N. Am. Fl. xxii[3]. 255 (1908), the name coming from Douglas's manuscript *Spiraea acuminata*, which had been cited by Hooker in the synonymy of *S. Aruncus* (= *Aruncus sylvester*). This Pacific American plant has the large follicles (FIG. 9), seeds and calyces of the Eurasian *A. sylvester* (or *A. Aruncus*), but Rydberg stated their "specific" differences as follows:

> Petals of the staminate flowers broadly rounded-obovate, about ⅘ as broad as long; leaflets lanceolate with long acumination ..... 1. *A. acuminatus.*
> Petals of the staminate flowers spatulate, ⅖–⅗ as broad as long; leaflets ovate, with shorter acumination..... 2. *A. Aruncus.*

Unfortunately the difference in shape of petals relied upon by Rydberg can be quickly reversed, FIG. 11 showing flowers, × 10, from Vancouver Island (of *A. acuminatus*) with spatulate petals, FIG. 10, flowers from Salisburia with them much broader!

As to the acumination of the leaflets I see no difference; FIG. 13 is a tip of a leaflet of *A. sylvester* from Europe, FIG. 12 one of *A. acuminatus* from America. The calyx-lobes of the western American plant are also quite like those of the Eurasian (FIG. 6). So are the follicles (FIG. 9), the styles and the seeds. In other words, *Aruncus sylvester* of Eurasia occurs also in western North America; while in the ancient Ozark and Appalachian uplands a species with smaller and more olivaceous follicles, longer styles, smaller seeds and firmer calyx occurs. It is unfortunate that, in defining the latter, Rydberg ignored the significant calyx-lobes, styles and seeds and over-stressed the fickle characters of pubescence.

Several names of early date are cited by Rydberg as synonyms under *Aruncus*, in the North American Flora; consequently, by some who have not understood the situation, one of them, *A. vulgaris* Raf. Sylva Tell. 152 (1838), has been used on herbarium-labels. Under *Aruncus*, Rafinesque, in 1838, published two names: "Type *A. vulgaris* and *Americanus*." No diagnoses were given and no previous descriptions were cited; the two names of Rafinesque are absolute *nomina nuda* and have no further nomenclatural status. Rydberg cites, with

doubt, as synonyms of his *A. alleghenicnsis*, the three following: *Spiraea Aruncus*, β. *hermaphrodita* Michx. Fl. Bor.-Am. i. 294 (1803); *S. Aruncus*, β. *americana* Pers. Syn. ii. 46 (1806); and *S. americana* Steud. Nom. Bot. 805 (1821). These all rest on one type, Persoon merely having substituted β. *americana* for Michaux's name and Steudel (bunglingly) resting his *S. americana* on the same plant. Now, ARUNCUS DOES NOT HAVE THE FLOWERS HERMAPHRODITE and when Michaux got hold of a plant in the Alleghenies which looked like the European *Spiraea Aruncus* but differed "floribus . . . hermaphroditis-fertilibus" he called it var. *hermaphrodita*. *Astilbe biternata* (Vent.) Britton, of the *Saxifragaceae*, does have hermaphrodite flowers. It grows side-by-side with *Aruncus alleghenicnsis* and so completely mimics it that only by detailed examination of the flowers and fruits can the two be readily separated. *Spiraea Aruncus*, β. *hermaphrodita* of Michaux was, as to the defined characters, *Astilbe*. This was the judgment of Torrey & Gray, in 1840: "The variety with perfect flowers, first mentioned by Michaux, is probably Astilbe decandra (Tiarella biternata, *Vent.*), which in habit strikingly resembles this plant."—Torr. & Gr. Fl. N. Am. i. 417 (1840). If *Spiraea Aruncus*, β. *hermaphrodita* Michx. is *Astilbe*, then, automatically, *S. Aruncus*, β. *americana* Pers. and *S. americana* Steud. are likewise *Astilbe;* and perhaps *Aruncus americanus* Raf. may, by inference, be also associated with *Astilbe*. At least, Rydberg was quite justified in giving the Alleghenian species a new and properly defined name.

Very recently further confusion has been made by a Japanese botanist, Hara, who unjustifiably adopts Rafinesque's NOMEN NUDUM *Aruncus vulgaris* to displace *A. sylvester* and then coins for the Alleghenian plant the unfortunate combination *A. vulgaris*, var. *americanus* (Pers.) Hara, Bot. Mag. (Tokyo), xlix. 115 (1935), entirely ignoring the fact that Persoon's *Spiraea Aruncus*, var. *americana* and all names dependent upon it are substitutes for *S. Aruncus*, β. *hermaphrodita* Michx., which is *Astilbe* of the *Saxifragaceae*.

(*To be continued*)

THREE JUNIPERS OF WESTERN TEXAS

V. L. CORY

A CONFUSION or misconception of certain species of North American junipers has long existed. For our purpose it suffices to go back only

as far as the acceptance by Engelmann of a species of the states of the Pacific Coast, *Juniperus occidentalis* Hooker, as occurring in Texas. The species to which he referred is known now as *J. mexicana* Spreng. In addition to this Engelmann described and named two varieties of *J. occidentalis* as occurring in Texas, namely vars. *conjugens* and *monosperma*. The first of these does not appear to be a good variety. As to the second of these it appears that Engelmann included more than one thing in the conception of his variety *monosperma*. In the first place this variety was distinguished from the species by having smaller bluish-black fruits with one or more less grooved seed. Had he stopped here it is granted that he would have indicated a good variety of the species which he was considering to be *J. occidentalis*, but not of that species as now known. However, he goes on to state: "In Colorado the berries are often copper-colored, as Parlatore describes those of the species (*J. occidentalis*) and in some trees the seeds protrude." The parentheses are the writer's, while the quotation is from Trans. St. Louis Acad. Sci. **3**: 590. 1877. It does seem that the quoted part of his description refers to something entirely different from the preceding portion of the same.

Considering first that part of Engelmann's description of his variety *monosperma* referring to its characterization by having smaller bluish-black berries with one or more less grooved seed, Sargent in 1889 recognized such a juniper as distinct from *J. occidentalis* and raised it to specific rank. Study of herbarium material, accepted by the Arnold Arboretum as authentic for both *J. mexicana* and *J. monosperma*, in fruit, seed, and other characters convinces the writer that the differences are insufficient for maintenance of the latter as a distinct species. It is his opinion that the latter should be recognized as a geographical variety of the former, its occurrence apparently being largely, if not entirely, north of the occurrence of the typical form of the species, and that it should be known as

JUNIPERUS MEXICANA Spreng., var. **monosperma** (Engelm.), new comb. *J. occidentalis*, β. *monosperma* Engelm. Trans. St. Louis Acad. **3**: 590 (1877).

Now considering that part of the description previously quoted, it seems to the writer that this refers to the juniper that was described by Lemmon in 1895 as variety *gymnocarpa* of Hooker's *J. occidentalis*. In 1915 Wooton and Standley refer to this particular juniper on page 58 of "Flora of New Mexico," and make the following statements:

"What is probably a form of *J. monosperma*, or possibly a distinct species, was described by Lemmon as *Juniperus occidentalis gymnocarpa*. It is said to have the solitary seed partly exposed at the apex, hence the name. Mr. Lemmon states that this form is 'abundant on the Sandia Mountains, near Albuquerque,' New Mexico. No specimens have been seen by the writers. The same form has been collected near Fort Huachuca, Arizona, by Gen. T. E. Wilcox." Field experience together with study of herbarium material convinces this writer that Lemmon's variety is a good species, and that it should be recognized as such by the name

Juniperus **gymnocarpa** (Lemmon), new comb. *J. occidentalis*, var. *gymnocarpa* Lemmon, West Am. Cone-Bearers, 80 (1895).

Juniperus gymnocarpa is clearly distinct from all other junipers in the mountains of southwestern Texas, while in fully mature fruit it is obviously distinct from all other described junipers. In southwestern Texas this species is a tree with a stout trunk, not branched for some distance above the ground, the branches spreading, relatively not stout, and forming an irregular head with dense foliage. The mature fruit is reddish-brown in color, but noticeably smaller than the fruits of other junipers of Texas having similar color in the mature fruit. The characteristic feature of the mature fruit, which marks it as a distinct species, is that the solitary seed, which is large for the cone containing it, is exposed at the tip for as much as one-fourth or more of the length of the seed. At maturity the fruits are broader than long, whereas preceding maturity they are not. Well-developed, fully mature fruits are about 5 mm. broad and 4 mm. high, with the exposed portion of the seed measuring as much as 1 mm., or slightly more, in height. The top of the cone consists of a thickened ring, with the diameter of the opening varying largely with the maturity of the fruit, with immature fruit, even when copper-colored, having no opening whatsoever, and mature fruit with an opening 2–3 mm. in diameter, the opening being somewhat ellipsoidal. As a concrete example, the following details are taken from one of the smaller, but fully mature fruits. The fruit is 3.5 mm. broad and 3 mm. high, with the exposed end of the seed projecting a full millimeter beyond, and with the opening of the apical cone-ring 2.5 mm. in diameter. The seed is pyriform, the basal part smooth and rounded, almost hemispherical, and above the basal part it is 2-winged, the wings gradually widening above, extending only to the edge of the exposed portion of the

seed, there truncate and supporting the apical ring of the cone. The seed is 4 mm. high, 2.7 mm. broad at its major diameter, and 1.5 mm. broad at the base of its exposed portion. The included portion of the seed is light-colored, while the exposed portion is dark-colored, dome-shaped, and with the center marked by a low, circular, blunt crateriform point 0.3 mm. in diameter, noticeably darker colored than its immediate surroundings.

This species of the mountain valleys of southwestern Texas apparently has a distribution westward through New Mexico to Arizona and north therefrom to southern Utah, Nevada, and Colorado, and possibly southward into Mexico. In Texas it grows only in the mountains, and there only in the higher valleys or on the mesa-like tops of the mountains of lower elevations. Its zone of occurrence is above that for *J. Pinchoti* and below that of *J. erythrocarpa*, and more or less coextensive with the zones of *J. pachyphloea* and *J. flaccida*, both of which species may be found at lower elevations than *J. gymnocarpa*.

Representative material deposited in the herbaria of the Arnold Arboretum and the Missouri Botanical Garden comes from a tree ten miles up Frazier Canyon from State Highway No. 17 in Limpia Canyon of the Davis Mountains, and was collected November 3, 1934.

The failure heretofore to recognize this juniper as a distinct species is quite probably due to the fact that the immature fruit, even after assuming the reddish-brown coloration, does not exhibit the characteristic exposure of the end of the seed. Because the fruit is strictly 1-seeded and, also, because it evidently was included by Engelmann in his variety *monosperma*, this species, in the absence until the present of special study devoted to it, has been considered heretofore either as *J. monosperma* itself or as a variety thereof. The present study is convincing that it is distinct.

While *J. gymnocarpa* long has been known in a more or less general way, another 1-seeded juniper, now shown to be distinct, if known at all was accepted likewise as being either *J. monosperma* itself or a form thereof. The writer first noted this species on August 27, 1927, on top of the Davis Mountains at a point about eight miles northwest of Alpine and about two miles directly south of Mitre Peak. Its mature bright-red, fleshy, 1-seeded fruits at once set it apart from the other species of junipers growing in these and other mountains of

southwestern Texas. However, it was more than six years later before further opportunity for study of this species was afforded. It was then that a special trip covering a thousand miles was rewarded by finding this juniper in mature fruit and in some abundance on the top of the Chisos Mountains, at least 85 miles on an airline south and east of the previous station. Material collected here on December 2, 1933, from the trees bordering the laguna at the west base of the peak of Mt. Emory is used for describing the new species.

Juniperus **erythrocarpa**, sp. nov. Arbor parvus plerumque minus quam 5 m. altus, ramis adscendentipatentibus; fructibus maturis globosis diametro 6–8 mm. plerumque circa 8 mm. rubris carnosis monospermis; semine pyriformi circa 5 mm. longo 4 mm. lato, pallido, supra basin laevem rotundatumque prominenter bicarinato, vitta fusca dimidiam partem superficiei tegente, in parte superiore faciei utraeque foveis tribus ellipticis 1 mm. vel ultra longis et ad fines vittae 1 vel 2 foveis duplo majoribus ornato.

A small tree, mostly under 5 m. in height, with branches ascending-spreading and forming an open, irregular head; mature fruits globose, 6–8 mm. in diameter, mostly near 8 mm., bright-red, fleshy, 1-seeded; seed pyriform, relatively broad, approximately 5 mm. long by 4 mm. broad, light-colored, above the smooth and rounded base prominently 2-ridged and marked by a dark-colored ridge-band, which covers as much as one-half or more of the surface of the seed, and further marked by 3 concavities, 1 mm. or more long and half as wide, on the upper part of each of the two faces, and either 1 or 2 concavities, about twice as large at each end of the ridge-band.

Representative material of this collection, from West base of peak of Mt. Emory, December 2, 1933, no. 7642 (type in Herb. Arnold Arboretum) is deposited in the herbaria of the Arnold Arboretum and the Missouri Botanical Garden.

Juniperus erythrocarpa is a small tree growing at the higher elevations in the mountains of southwestern Texas, and it should occur also across the Rio Grande in the mountains of Mexico. In Texas this juniper is unique in the striking coloration of its mature fruits and in the strong markings of its seeds. A seed 5 mm. long and 4 mm. broad at its major diameter has a smooth, hemispherical, light-colored base, with the rounded ends of the dark-colored ridge-band beginning at slightly more than 1 mm. above the center of the base on opposite sides, here being 3 mm. broad, but broadening as they rise into an arch which covers the apical end of the seed. On both sides the ridge begins just above the end of the ridge-band and is continuous across the obtuse apical end of the seed, which is flattened in one plane and

acute in a plane at right angles thereto, and not at all dome-shaped, as in *J. gymnocarpa*. At the center of the apex of the seed, or slightly to one side of the center, the ridge bears a darker-colored circular point, which is approximately 0.25 mm. broad and almost as high. The dark-colored ridge-band covers from about one-half to as much as three-fourths of the surface of the seed, the relatively longer seeds being less rounded at the base and having more of their surface covered by the dark-colored band. The concavities are oblong, rounded, shallow depressions regularly and uniformly arranged on opposite sides of the seed. Each face has 3 similar concavities on its upper portion, all 3 situated partly in the light-colored area and partly in the dark-colored area, except that in the longer and narrower seeds one of these concavities lies wholly within the dark-colored area. Likewise at each end of the dark-colored ridge-band are situated 1 or 2 concavities, about 2 mm. long and 1 mm. broad, and slightly deeper than the upper concavities. In the relatively broad seed there is usually one such concavity, and this lies partly in the light-colored area and partly in the ridge-band area, the ridge itself beginning in the concavity, whereas in the longer and narrower seed there are usually 2 concavities at each end of the ridge-band, and situated wholly within its area, being narrowly separated by the ridge, the angle of which is markedly accentuated by the proximity and depth of the two concavities.

Grateful acknowledgement is made for the courteous and valued assistance of Mr. Ernest J. Palmer of the Arnold Arboretum given from time to time while these studies were in progress, and also to Dr. Julian A. Steyermark of the Missouri Botanical Garden for helpful suggestions concerning the manuscript.

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NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—XIV

Norman C. Fassett

Vicia Cracca and its Relatives in North America. The range of *Vicia Cracca*, as usually described, includes most of the Middle

West. Nearly all the material the writer has seen[1] from the states of Minnesota, Wisconsin, Iowa, Illinois, and Indiana, identified as *V. Cracca*, belongs to other species. The range of *V. Cracca* in North America appears to be as follows: Greenland; James Bay; Newfoundland to Delaware, west to southeastern Michigan and western Ontario; northeastern Wisconsin; southern Alberta to Washington.

Most frequently mistaken for *V. Cracca* is *V. villosa*, which largely replaces it in the Middle West. The floral differences between these

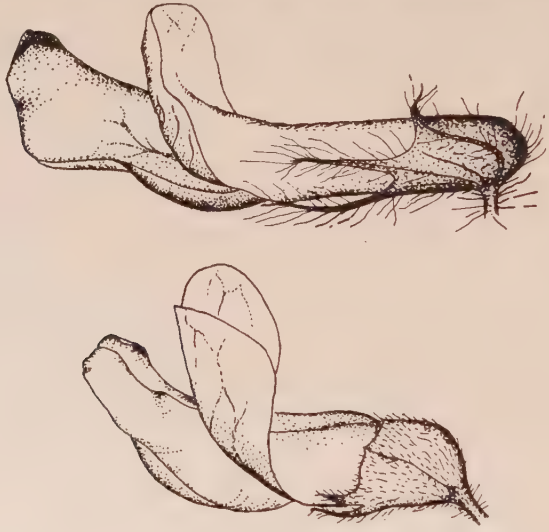

Fig. 1. Flower of Vicia villosa (above) and of V. Cracca (below), × 5.

two species are shown in the drawings by Dr. R. I. Evans. *V. villosa* ranges from Maine to South Carolina and Mississippi, westward to California and British Columbia. There is some variation in flower size and in pubescence.

A species not previously recorded from North America is *V. dasycarpa*. Specimens have been seen from Maine, New York, Pennsylvania, New Jersey, Delaware, Virginia, North Carolina, Georgia, Michigan, Montana, and California. All the collections were made

[1] Including collections in the Gray Herbarium, the Britton Herbarium of the New York Botanical Garden, the Academy of Natural Sciences of Philadelphia, the Field Museum of Chicago, the University of Minnesota, the University of Wisconsin, the University of Michigan, Michigan State College, Iowa State College, the Milwaukee Public Museum, and the Herbarium of Mr. C. C. Deam.

within the last two decades, except two. These were both on ballast: Communipaw Ferry, New Jersey, July 7, 1879, and Greenwich Point, Philadelphia, Pennsylvania, May 18, 1898.

A fourth species in this group is *V. tenuifolia*, which is established in the University Orchard at Madison, Wisconsin.

These four species may be distinguished as follows:

a. Flower less than 4 times as long as broad; limb of standard at least as long as the claw; calyx not gibbous at base, its lobes long-triangular, 1–2.5 mm. long....*b.*
  b. Limb of standard about equalling the claw; raceme not usually more than 1½ times as long as its subtending leaf....*c.*
    c. Leaflets glabrous to dull-pilose above; stem appressed-pubescent....*d.*
      d. Corolla purplish or blue.....*V. Cracca* L.
      d. Corolla white.....*V. Cracca* f. *albida* (Peterm.) Gams.
    c. Leaflets silvery-silky above; stem tomentose
      V. Cracca f. *sericea* (Peterm.) Beck v. Man.
  b. Limb of standard longer than the claw; raceme about twice as long as the subtending leaf.....*V. tenuifolia* Roth.
a. Flower at least 5 times as long as broad; limb of standard less than ½ as long as the claw; calyx strongly gibbous at base above the attachment of the pedicel, its lobes almost thread-like....*e.*
  e. Plant more or less appressed-pubescent or nearly glabrous; lowest lobe of calyx 1–2 mm. long.....*V. dasycarpa* Ten.
  e. Plant with long spreading white hairs; lowest lobe of calyx 2–4 mm. long....*f.*
    f. Corolla purple to blue.....*V. villosa* Roth.
    f. Corolla white.....*V. villosa* f. *albiflora* (Schur) Gams.

Some Forms of Desmodium. The three species, *Desmodium acuminatum*, *D. nudiflorum*, and *D. pauciflorum*, are ordinarily so easily distinguished on a basis of the distribution of the leaves that this is largely relied upon in most keys. The result is that an occasional specimen with distribution of foliage unusual for the species is nearly always misidentified. A not uncommon form of *D. nudiflorum*[1] with scattered leaves on the flowering stems is often misdetermined as *D. pauciflorum*. A similar form of *D. acuminatum*[2] sometimes causes confusion. *D. nudiflorum* rarely has leaves clustered on the flowering stem as in *D. acuminatum*.[3]

[1] D. nudiflorum f. **foliolatum** (Farwell) n. comb. *Meibomia nudiflora foliolata* Farwell, Papers Mich. Acad. Sci. i. 95 (1923).

[2] D. acuminatum f. **Chandonnetii** (Lunell) n. comb. *Meibomia grandiflora Chandonnetii* Lunell, Am. Midland Nat. ii. 128 (1911).

[3] D. nudiflorum f. **personatum**, n. f., caulis cum floribus et cum foliis subverticillatis.—Pastured wooded hillside, Gassner Hollow, Wyalusing, Wisconsin, August 14, 1934, *Fassett*, no. 16735 (type in the Herbarium of the University of Wisconsin).

There seems to be but one color form recorded in this group, a white-flowered *D. nudiflorum*.[1]

There are, of course, adequate floral and vegetative characters besides those too often relied upon in the separation of these three species. The following key should be of use in placing all forms.

a. Flowers 6–8 mm. long; remains of stamen-tube at base of fruit 6–8 mm. long; stipe of fruit glabrous or minutely granular....*b.*
b. Pedicels 5–8 mm. long in fruit; terminal leaflet about as long as broad, with a tapering point 1–2.5 cm. long, light green beneath, with white spreading or appressed hairs on both surfaces; stipules (3–)6–10 mm. long....*c.*
c. Leaves clustered about midway on the flowering stem. *D. acuminatum* (Michx.) DC.
c. Leaves more or less scattered on the flowering stem. *D. acuminatum* f. *Chandonnetii* (Lunell) Fassett.
b. Pedicels filiform, 1–2 cm. long in fruit; terminal leaflet nearly or quite 1.5 times as long as broad, abruptly pointed or with a tapering tip 0.5 cm. long, whitened beneath and mostly glabrous except on the veins, above with almost microscopic glandular hairs as well as a few scattered larger white hairs; stipules 1.5–3.5 mm. long....*d.*
d. Flowers violet....*e.*
e. Flowering stem naked.....*D. nudiflorum* (L.) DC.
e. Flowering stem with leaves....*f.*
f. Leaves scattered on flowering stem. *D. nudiflorum* f. *foliolatum* (Farwell) Fassett.
f. Leaves subverticillate on flowering stem. *D. nudiflorum* f. *personatum* Fassett.
d. Flowers white.....*D. nudiflorum* f. *Dudleyi* (House) Fassett.
a. Flowers 3–6 mm. long, white; remains of stamen-tube at base of fruit 2.5–3 mm. long; stipe of fruit with minute hooked hairs; pedicels less than 1 cm. long in fruit; terminal leaflet about 1.5 times as long as broad, with scattered white appressed hairs above and below, whitened beneath. *D. pauciflorum* (Nutt.) DC.

Amorpha fruticosa L., var. angustifolia Pursh, f. **latior**, n. f., foliolis 2–5 cm. longis 1–2 cm. latis.—Stony shore of Lake St. Croix, 10 miles south of Hudson, Wisconsin, August 2, 1934, *Fassett*, no. 17014 (type in Herbarium of the University of Wisconsin).

A. fruticosa var. *vulgaris* Pursh (typical *A. fruticosa*) is fairly constant in the proportions of the leaflets, which are about twice as long as broad, while the more western var. *angustifolia*, which was originally defined as a shrub with narrow leaflet,[2] may have them

[1] D. nudiflorum f. **Dudleyi** (House) n. comb. *Meibomia nudiflora* f. *Dudleyi* House, Bull. N. Y. State Mus. ccxliii–ccxliv. 52 (1923).

[2] Schneider, Bot. Gaz. xliii. 303 (1907), expresses doubt as to the identity of Pursh's plant. An examination of this specimen, at the Academy of Natural Sciences of Philadelphia, shows it to be identical with the plant with narrow leaflets here treated as var. *angustifolia*.

either very narrow or as broad as in var. *vulgaris*. The most reliable distinction between the two varieties seems to be in the nature of the pubescense of the lower side of the midrib of the leaflets, which is closely appressed in var. *angustifolia* and spreading in var. *vulgaris*. (The amount of pubescence is variable in each). Var. *vulgaris*, while constant in proportions of leaflets and type of pubescence, may have the base of the leaflets either cuneate or rounded. Var. *angustifolia* is constant in having appressed pubescence and cuneate leaflet-bases, but is variable in width of leaflets. Var. *angustifolia* occurs from Wisconsin to Texas, northwestward to southern Saskatchewan, westward to Colorado and southward to northern Chihuahua. Var. *vulgaris*, as here defined, is more eastern, ranging westward to northern Illinois and southern Arkansas. All specimens from Minnesota, Wisconsin, Iowa, Kansas, and Missouri, identified as typical *A. fruticosa*, appear rather to be var. *angustifolia* f. *latior*.

Amorpha canescens Pursh, f. **glabrata** (Gray) n. comb. *A. canescens* var. *glabrata* Gray, Pl. Wright. i. 49 (1852).

Plants with the leaflets nearly glabrous or with sparse crinkled hairs are of frequent occurrence throughout the range of *A. canescens* in Wisconsin; these often, but not always, have the short rounded leaflets described by Schneider.[1] Leaves which are extreme both in lack of pubescence and in oval shape of leaflets may be found on stems attached to rootstocks which bear also stems with foliage normal for the species.

Madison, Wisconsin.

NOTES ON THE FLORA OF COLUMBIA, MISSOURI, III.

Francis Drouet

The following additional changes in the knowledge of the flora of Columbia, Missouri, are based upon recent collections and upon material in the Herbarium of the University of Missouri upon which the Floras of Columbia by Dr. Francis Daniels (Univ. Mo. Stud. **1**(2). 1907) and by Dr. H. W. Rickett (Univ. Mo. Stud. **6**(1). 1931) were founded. Similar notes have appeared in Rhodora **35**: 359–364, **36**: 415–417, and **37**: 189–196. Dr. J. A. Steyermark and Mr. B. F. Bush have examined most of the specimens and have cooperated in many

[1] L. c. 300.

other ways. Dr. K. M. Wiegand has seen and annotated the sheets of Echinochloa and Aster; Dr. E. E. Watson those of Helianthus; and Dr. H. A. Gleason and Mr. G. W. Bohn those of Vernonia concerned. The writer, however, assumed full responsibility for the data listed below. The names preceded by an asterisk (*) indicate species which have not previously been reported or collected in the Columbia region.

Echinochloa muricata (Michx.) Fernald, Rhodora **17**: 106. 1915. *E. Crus-Galli* of the Columbia Floras. A few specimens are annotated by Dr. Wiegand as intermediate between the typical variety and the var. *microstachya* Wieg.

*Echinochloa muricata var. occidentalis Wiegand, Rhodora **23**: 58. 1921. Two specimens from the bottoms of Hinkson Creek: "Old Waterworks," *Jeffrey*, July 24, 1933; "8 miles north of Columbia," *Jeffrey 377*, Oct. 21, 1933.

Festuca octoflora Walt. var. tenella (Willd.) Fernald, Rhodora **34**: 209. 1932. Additional material collected on the sandstone outcrops north of Claysville, *Drouet 1370*, Apr. 29, 1934.

Trillium Gleasoni Fernald, Rhodora **34**: 21. 1932. See also Rhodora **36**: 121–128. 1934. *T. declinatum* (Gray) Gleason. *T. erectum* of the Columbia Floras.

Celtis laevigata Willd. var. texana (Scheele) Sarg. *C. laevigata* of the 1931 Flora, in part.

Polygonum ramosissimum Michx. *P. tenue* of Drouet, Rhodora **37**: 191. 1935.

Ranunculus septentrionalis Poir. Includes *R. hispidus* of the Columbia Floras.

Arabis virginica (L.) Trel. *Cardamine pennsylvanica* of the Columbia Floras.

*Linum sulcatum Riddell. County Road Prairie, Callaway Co.: *Jeffrey & Drouet 823*, July 30, 1933; *Drouet 1669*, Aug. 15, 1934.

Helianthemum Bicknellii Fernald, Rhodora **21**: 36. 1919. *H. majus* of the Columbia Floras, not BSP. Daniels (Flora, p. 177) says of this, "scarce on high bluffs." His single specimen "High bluffs, Columbia," July 1903, bears the annotation "Scarce!" The species had apparently not been recognized in the region since Daniels, until the summer of 1933. Two recent collections are "Barren cliff above Hinkson Creek east of Lover's Leap," *Drouet 889*, Aug. 5, 1933, and "County Road Prairie," Callaway Co., *Drouet 1671*, Aug. 15, 1934.

Steironema lanceolatum (Walt.) Gray. Including *S. radicans* of the 1931 Flora, p. 59. The leaves and calyces of the fragmentary specimen cited as *S. radicans* ("Horseshoe Lake," *Daniels*, Aug. 1897) are quite similar to those of other specimens of *S. lanceolatum* in the collection. The var. *hybridum* of Rickett's Flora and *S. hybridum* of Daniels are based upon portions of inflorescences of large plants

("Swamp south," *Daniels*, Aug. 1904, and "Horseshoe Lake," *Daniels*, Aug. 1897) with long, narrow upper leaves. Further collections and field observations will be necessary to establish whether or not such specimens are luxuriant forms of the typical variety produced under exceptionally favorable environmental conditions.

Apocynum androsaemifolium L. Including the var. *incanum* of the 1931 Flora. Only two collections are known to me, these from south of Columbia: "Fields south," *Daniels*, July 1903; "Pasture and fields by Black's Mill Road east of Tinspout Spring," *Drouet 1692*, Aug. 26, 1934.

Boltonia latisquama Gray. Collected recently as a waif in the University Orchard, *W. Bohn 403*, Sept. 26, 1934.

Chrysanthemum leucanthemum L. var. pinnatifidum Lecoq & Lamotte. Including *C. Leucanthemum* of the Floras.

All of the Columbia specimens have pinnatifid basal and cauline leaves, and there is surely no other morphological basis for distinguishing two varieties among them.

Vernonia altissima Nutt. Including *V. chrysopappa* Daniels and *V. fasciculata* of the 1931 Flora.

In the genera Aster and Helianthus, where an entirely new arrangement of specimens has been found necessary and where the greater number of sheets of Columbia plants has been added since the publication of the Floras, it seems advisable to present a list of species and varieties as now recognized and to omit synonymy of earlier lists. The 192 sheets of Aster from the Columbia region have been distributed into the following categories, if we omit those few which are at present interpreted as "hybrids" between "typical" forms.

Aster anomalus Engelm.

Aster cordifolius L.

I can find no morphological basis among the Columbia material for separating a var. *polycephalus* Porter as distinct from the typical variety.

Aster Drummondii Lindl.

Aster ericoides L. var. prostratus (Kuntze) Blake, Rhodora **32**: 138. 1930. *A. multiflorus* Ait. and var. *exiguus* Fernald, in part.

The typical variety undoubtedly occurs here, but no specimen of it is found in the present Columbia collection.

Aster interior Wiegand, Rhodora **35**: 35. 1933. Two collections are doubtfully referred here: "Boone Co.," *Favor*, Sept. 23, 1901; "Low ground along railroad ½ mile north of Browns Station," *Drouet 1168*, Sept. 16, 1933.

The specimens resemble closely those of *A. paniculatus* var. *simplex*

but have smaller heads. It would seem more satisfactory at present to treat these specimens as "hybrids."

Aster lateriflorus (L.) Britton var. pendulus (Ait.) Gray. *A. lateriflorus* of Gray's Manual, ed. 7, in part. See Rhodora **30**: 173. 1928.

Aster novae-angliae L.

Aster oblongifolius Nutt. var. rigidulus Gray. *A. Kumleini* Fries.

Aster paniculatus Lam. var. simplex (Willd.) Burgess. See Rhodora **35**: 32. 1933. One specimen, "Moist places, Columbia," *Daniels*, Sept. 26, 1902, with narrow leaves and open habit approaches the typical variety. This specimen is obviously the basis of the var. *bellidiflorus* of the Columbia Floras.

*Aster pantotrichus Blake, Journ. Wash. Acad. Sci. **21**: 327. 1931. *A. missouriensis* Britton.

Often encountered, and always raising in one's mind the suspicion that it might be an ecological form of *A. lateriflorus* var. *pendulus*.

Aster parviceps (Burgess) Mack. & Bush. *A. depauperatus* (Porter) Fernald var. *parviceps* (Burgess) Fernald. See Rhodora **11**: 59. 1909. Common in old fields, etc.

Aster patens Ait.

Aster pilosus Willd. *A. ericoides* of Gray's Manual, ed. 7, sens. ampl., not L.

Specimens from central Missouri appear to represent every gradation between any two of the three extremes: var. *demotus* Blake, var. *platyphyllus* (T. & G.) Blake, and the typical variety. See Rhodora **32**: 139. 1930.

Aster praealtus Poir. *A. salicifolius* of Gray's Manual, ed. 7, in part, not Lam.?

Aster sagittifolius Wedemeyer.

Aster turbinellus Lindl.

The 107 sheets of Helianthus from Columbia have been checked over by Dr. Watson and myself according to his recent revision (Papers Mich. Acad. Sci. **9**: 305–475. 1929). They appear to fall in the following grouping.

Helianthus rigidus (Cass.) Desf. (*H. scaberrimus* Ell.), H. annuus L., H. mollis Lam., H. tomentosus Michx., H. leptocaulis (S. Wats.) Blake, H. hirsutus Raf., H. grosse-serratus Martens, *H. severus E. E. Wats., H. tuberosus L., H. tuberosus var. subcanescens Gray, H. membranaceus E. E. Wats., H. formosus E. E. Wats., H. leoninus E. E. Wats., and H. strumosus L.

It would seem more proper at present to consider the specimens disposed under *H. tomentosus* and *H. leptocaulis* as ecological variations

or divergent races of *H. hirsutus*, since the morphological characters separating the three groups are so variable. One is often led to suspect that his final decision as to the identity of a specimen has been influenced overmuch by personal inclination or chance. One receives a similar impression with the specimens in the group *H. strumosus*, *H. formosus*, and *H. leoninus*.

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A further Note on Solidago rigida L.[1] The late K. K. Mackenzie and I had many arguments on points of nomenclature, particularly on methods of typifying old species. A few of them got published; more remain in the files of a correspondence probably as acrimonious as any which ever took place and still left the participants personally friendly. He and I were somewhat like the professional soldiers of the eighteenth century—hostile enough at the moment of battle, but afterward disposed to accept one another as brothers in our craft. On the rather rare occasions when I did something of which he could approve, he was generous in his commendation; and I am indebted to him for several notable kindnesses. It seems almost like taking a mean advantage to continue an argument now that he cannot reply; I shall rather miss the pungent rejoinder he would have been sure to make.

But the primary object of this note and of a few which may follow it is not to prove Mackenzie wrong, but to complete the record. Whether one takes his point of view or mine, it should be of advantage to have all the evidence at hand. And one part of it—the specimens which lie back of the Linnean citations—has not, in this instance, hitherto been investigated. Therefore, when a visit to Europe in 1935 gave me the opportunity, I attempted to find and examine such of them as are still in existence.

It will be recalled that Linnaeus based *Solidago rigida* wholly on two references, one to Hortus Cliffortianus and one to a plate in Hermann's Paradisus Batavus. The specimen in the Clifford herbarium and a duplicate in the herbarium of Linnaeus himself have long been known and are *S. rigida* in the traditional sense. The issues between Mr. Mackenzie and me were two: first, whether these speci-

[1] See Rhodora, xxviii. 29 and 138 (1926); xxix. 26 (1927).

mens or the plate of Hermann should be taken as typifying the species; second, if the latter, whether or not he was correct in interpreting it as *S. patula.* It was to settle the latter point that I endeavored to find specimens which should represent Hermann's conception.

No specimens illustrating the Paradisus exist at Leyden or are known to exist elsewhere. Probably the nearest approach to anything authentic is a specimen in the Sloane herbarium at the British Museum. This is in the Bonivart collection (vol. 84), said by Sloane to have come "most of the garden of Leyden from Dr. Hermann, etc." Its label bears a reference to the Paradisus and a phrase-name which seems to be made up of excerpts from the various citations given by Linnaeus in the Hortus Cliffortianus: "Virga aurea Americana s. Noveboracensis Doria similis late rigidoque folio. Par. Bat. Pr." The specimen is *S. rigida* in the traditional sense. So are an old specimen from the Paris garden[1] and two from the Chelsea garden, all bearing Hermann's phrase-name. I could find no specimens of any other species with this name attached.

The evidence from specimens, then, is of a rather negative character. There is no actual assurance that the Bonivart plant came from Leyden, though, since most of his material did, there is a fairly strong probability; and no connection between the others and Hermann can be traced. One thing, however, seems clear. During the period between the publication of the Paradisus and the Species Plantarum, Hermann's phrase-name was widely, if not universally, applied in the botanic gardens of the time to the plant which has ever since passed as *Solidago rigida;* and there is no evidence that it was ever applied to anything else. Mr. Mackenzie's case rests wholly on his own (to me, dubious) interpretation of the Hermann plate. The interpretation of Hermann's contemporaries, as well as of unanimous usage since, is against him. And the acceptance of the Clifford specimen, which Linnaeus saw, as the type of the species, seems more reasonable than ever.—C. A. Weatherby, Gray Herbarium.

[1] Which might possibly represent the plant back of the passage from Tournefort cited in the Hortus Cliffortianus. For full quotation of these references see Rhodora, xxviii. 30–31.

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